INSTRUCT-O-GRAM

THE HANDS-ON TRAINING GUIDE
FOR THE FIRE INSTRUCTOR

Subfloor Rescue Techniques - Part I

TRAINING OBJECTIVE:
Following this program, the student will be able to properly demonstrate six (6) techniques for rescuing a downed/trapped firefighter from a sub floor.

METHODS OF INSTRUCTION:

- Lecture
- Demonstration
- Practical Exercises

INSTRUCTIONAL AIDS:

- Course Outline
- Video Projection Unit
- Department Safety Engine/R.I.T. Standard Operating Guideline/Procedure
- Related:
  a. USFA Technical Reports
  b. NIOSH Reports
  c. N.F.P.A. Fire Investigation Reports
- Smoke Generator (Synthetic/Non-toxic)
- Acquired structure or burn house training facility

PERFORMANCE OBJECTIVES:

Following this segment, the student will:

- Describe the eight (8) cues to be considered when attempting locate a downed/trapped firefighter with 100% accuracy.
- Describe the proper method of stabilizing a floor when attempting to gain access/ rescue a downed/trapped firefighter with 100% accuracy.
- Identify three (3) different methods of gaining access to a sub floor for firefighter rescue with 100% accuracy.
- Demonstrate the correct method of extracting a firefighter using a single and double handcuff knot with 100% accuracy.
- Demonstrate the proper use and application of a M.A.S.T. tool as it pertains to sub floor rescue operations with 100% efficiency.
- Demonstrate the correct method of extracting a firefighter using a charged hoseline with 100% accuracy.

REFERENCES:

- American Heat Video, (1995,Oct.) *Firefighter Health & Safety*, Volume 10, Program 10, Carrollton, Texas
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- Crawford, James K. (1998, Feb.) *Rapid Intervention Teams: Are You Prepared For Removal?* Firehouse, p. 59-63
- Firehouse.com/lodd/2001/nj_mar26.html, *NJ Firefighter Loses 3-Month Battle,* March 26, 2001
- Firehouse.com/lodd/2001/oh_mar20html, *Ohio Firefighter Trapped in Fire Succumbs to Injuries,* March 21, 2001
- Lasky, Rick, Hoff, Ray (1998, Mar.) *Saving Our Own: The Firefighter Who Has Fallen Through The Floor* Fire Engineering, p. 12, 14, 18
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- National Institute for Occupational Safety and Health (NIOSH)(2000, Sept.) *Death in the Line Of Duty, Report 99-F-47*
- National Institute for Occupational Safety and Health (NIOSH)(1998, Nov.) *Death in the Line Of Duty, Report 98-F-17*
- National Institute for Occupational Safety and Health (NIOSH)(1997, Feb.) *Death in the Line Of Duty, Report 97-F-04*
- Norman, Michael (1987, Dec.) *The Murder of John Nance,* Columbus Monthly, p. 41-49
- Sendelbach, Timothy E. (2000, Nov./Dec.) *Safety Engine/RIT Search Operations – Standardized Methods for the Fireground "Mayday!"* Voice p. 9-16
- United States Fire Administration, Emmittsburg, Maryland, USFA Technical Report-073 *Floor Collapse Claims Two Firefighters Pittston, Pennsylvania*

ESTIMATED TEACHING TIME:

8-16 Hours - Annual review recommended

INTRODUCTION:

In 1995-96 the staff of Illinois Fire Service Institute and several adjunct instructors introduced the "Saving Our Own" program to the national fire service. As part of this program, particular focus was placed on the John Nance incident, which occurred in Columbus, Ohio on July 25, 1987. The thrust of this program and the circumstances of this incident were reviewed by these and many other fire service instructors to develop specific techniques in hopes of preventing similar tragedies in the future. The advent of the infamous "handcuff knot" (Developed by then Battalion Chief John Norman, FDNY) brought about a simple yet functional approach to rescuing firefighters who have fallen into basements and/or various sub floors. Unfortunately, despite the admirable efforts of many, the frequency of sub floor tragedies continues to haunt the fire service.

In March of 2001, (and several others since then) the fire service lost two brother firefighters to floor collapses, which closely replicate this event. This multi-part program will provide an in-depth look at the Columbus incident while presenting a number of new concepts to be considered when attempting sub floors rescues.

PRESENTATION:

Over the past eight years I've had the distinct privilege of teaching several thousand firefighters the firefighter rescue/survival techniques taught to me by the staff of the Illinois Fire Service Institute. After each of these sessions I continue to find myself pondering the thought of new and innovative ways to overcome these tragic events. Following a great number of in-depth discussions and periodical readings coupled with my trial and error efforts, the lessons shared by myself and many fire service professionals

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from across the country have been compiled into this program for your consideration.

The first step in initiating a sub floor rescue or firefighter rescue is to locate the downed/trapped member(s), this can be accomplished by considering the following (See: *The Instructor IOG – Safety Engine/RIT Search Operations Part I – April 2004 for more detailed information*):

1. **Knowledge of their last known location** - (Using radio reports, last assignment, progress reporting, etc.).
2. **Tracing hose lines into the area the firefighter(s) were known to be -** (If the lost/trapped member was assigned as an attack crew, consider following the hose line and initiating a search in the immediate area of the hose line).
3. **Evidence of building structures or locations that were described by lost or trapped firefighters** - (Utilize the geographical identifiers provided by the lost/trapped member i.e. bedroom, rollup door, etc).
4. **Listening for the audible sounds of a PASS** - (Assign exterior members to monitoring points on all sides of the structure).
5. **Listening for the sound of an SCBA low-pressure alarm** - (four point monitoring).
6. **Listen for shouts of help, tapping sounds, sounds of breathing, etc.** - (four point monitoring).
7. **Listen for sounds of portable radio broadcasts audible in the search area** - (Consider using the Feedback Assisted Rescue (FAR) technique to enhance the broadcast – place two radios together while transmitting with both simultaneously thereby creating a screeching feedback. If the downed firefighter is equipped with a workable a radio, this will transmit a screeching sound enabling search crewmembers to locate the lost/trapped firefighter).
8. **Look for flashlight beams** – direct beams at the ceiling or flashing lights within the structure. Consideration should be given to turning off all emergency lighting and/or scene lighting momentarily to help in locating any potential signaling from the lost/trapped member.

PRIORITIES - UPON LOCATING THE DOWNED MEMBER:

1. S **- Situational size-up, stabilization of immediate area, and personal safety of victim and rescuers.**
2. A **- Assessment of the downed/trapped member(s).**
3. F **- Firefighter(s) needs report –** AIR, WATER, **and** EXTRACTION / EXTRICATION**.**
4. E **- Extraction/Extrication process – Ladders, ropes, specialized equipment.**
5. ***Ty*** *- Treatment/Termination of rescue process – PAR (Personnel accountability report).*

***Although time is of the essence when firefighter(s) become trapped, lost or disoriented, proactive consideration MUST be directed at ensuring the member(s) safety if the initial rescue efforts fail or become long in duration – the most notable limitations are air, water and entrapment.**

PERSONNEL NEEDS:

The availability of personnel during any downed/trapped firefighter situation is of the utmost of importance. Upon receipt of a "Mayday!" report, on scene commanders should immediately summons an additional alarm to ensure the availability of additional personnel to support the rescue operation. Strict discipline of on scene personnel is also critically important, self-deployment **CANNOT BE TOLERATED**.

TOOLS TO CONSIDER:

Air Supply: As has been mentioned in previous Firefighter Safety & Survival IOG's, AIR is the most important tool to be considered during any firefighter rescue operation. Incident Commanders must ensure that additional cylinders are available for immediate rescuer change out while at the same time ensuring supplemental cylinders are available for the downed/trapped member. If not already on scene, a mobile air cascade (MAC) unit should be summons to allow for rapid filling of exhausted cylinders.

Hose lines: Efforts to defend the downed/trapped member(s) from direct flame impingement by fire are absolutely critical. This effort can only be accomplished by the proper placement and operation of multiple hand lines and/or high volume master streams to ensure the safety of the members performing the rescue and also the prolonged stability of the involved structure. On scene personnel should make every effort to buy additional time for the rescue operation by rapidly extinguishing the impinging fire or as an absolute minimum, hold the fire in check.

Ladders (Attic or Scuttle): Rapid access and egress from sub floors may be possible through the use of an attic/scuttle ladder. On scene personnel must immediately deploy/stage additional attic/scuttle ladders for rescuer use if the need arises.

Rope: The use of rope is a quick and acceptable method of tractability for deployed Safety Engine/RIT personnel. The use of rope during sub floor extraction operations may also be a consideration for lifting the downed/trapped member from the sub floor.

Hardware: Although rescue hardware such as pulleys, carabineers, ascenders, etc. is not typically used on the fireground, the availability of such hardware can offer the Safety Engine/RIT personnel an additional option during sub floor rescue operations. Like most Safety Engine/RIT operations, the sub floor rescue requires a quick method of removal, unfortunately, these rescues may also require members to lift or move a substantial amount of weight (i.e. floor joint, rafter assembly, victim, etc.) with minimal personnel. The use of various hardware may provide a suitable solution to overcoming what otherwise could be considered a fatal shortcoming of physical strength.

Multiple Application Service Tool (M.A.S.T.): The M.A.S.T. tool is a specialized tool that should be part of every Safety Engine/RIT response kit. Although the M.A.S.T. tool is a specialized tool, it is a very compact, lightweight tool that offers a great deal of versatility to the sub floor rescue operation. Rapid application of such a device provides the rescue crew with a multitude of points for lifting and/or dragging the downed/trapped member.

Scene Lighting / Extension Cords: The use of additional interior and exterior scene lighting cannot be mentioned enough. One of the biggest handicaps faced by Safety Engine/RIT personnel is visibility. Additional scene lighting can expedite the rescue operation while at the same time provide a means of orientation for lost or disoriented members. Extension cords can also be used for sub floor rescue operations if rope is not readily available.

Hand tools: The need for hand tools for forcible entry/exit, anchoring devices, enlarging openings, etc. once again supports the general rule of every member being properly equipped with the necessary hand tools to accomplish the assigned task. Incident commanders should immediately request that available on scene personnel gather and stage additional hand tools to support the needs of the deployed Safety Engine/RIT personnel.

Saws – Power and/or hand saws: Sub floor rescue operations may require Safety Engine/RIT personnel to enlarge various openings and/or breach interior walls to gain better access to the downed/trapped member. Power saws such as chain saws, circular saws w/ various blades and battery-operated saws provide the Safety Engine/RIT crew various alternatives if the need arises.

RESCUE ACTION PLAN:

Floor Stabilization – **As has been stated several times previously, rescuer safety is absolutely priority one. Upon entering an area in which a firefighter or firefighters have fallen into a sub floor due to structural collapse, immediate attention must be directed at stabilizing the working area. Stabilizing the working area can be accomplished by simply**

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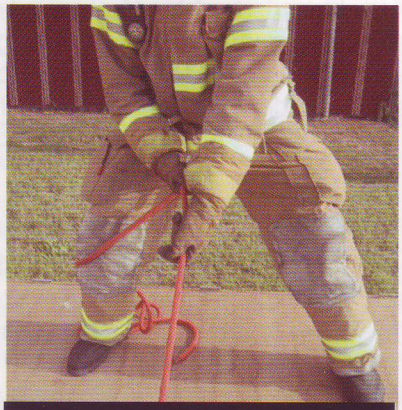
removing interior doors and using them as working platforms to distribute the rescuers weight over a larger surface area. Interior furnishings, bookcases, tables, shelves, cabinets, etc. should be considered as suitable alternatives to stabilizing the working area. The critical point to consider is that your weight and the weight of any and all additional rescuers must be distributed over the largest working surface possible to avoid a secondary collapse situation.



Interior door being used to distribute the rescuers weight.

Anchoring Systems – The need to gain immediate access to the downed/trapped member may require the use of a quick anchoring system to hold a rope and/or hose stationary to enable a rescuer to gain access. Hand tools such as an axe or Halligan provide a multitude of options when considering anchor points.

Fig. 1

A pick head/flathead axe driven into a hardwood floor (Fig. 1) using the pick or straight blade of the axe will provide an effective tie off point for a rapid decent into a sub floor. Simply strike the axe into the floor as deep as possible (½ or greater is recommended) with the handle pointing in the direction of the opening. Tie a figure eight with a bite in one end of the rope, slide it over the handle, wrap the head of the axe and finish with a half-hitch ½ - ¾ of the way up the handle.

Fig. 2

A Halligan tool can also be used in a number of ways to establish a quick anchoring point for a rapid decent into a sub floor. The most effective way would be to punch a hole through a sheetrock wall using one end of the tool, tie a clove hitch or similar knot around the Halligan tool and place the Halligan tool on the opposing side of the wall making sure the tool is perpendicular to the opening thereby crossing several wall studs. Additionally, a Halligan can be used by simply placing the tool across the lower portion of a window jam (at an angle), tying a clove hitch or similar knot around the Halligan (Fig. 2) while maintaining continuous tension – **this method should serve as a last resort.**

GAINING ACCESS:

***NOTE:** In conjunction with the interior rescue efforts, exterior personnel should initiate a simultaneous rescue effort if at all possible. Exterior personnel should immediately perform a 360° survey of the occupancy to determine potential access to sub floors via cellar doors, exterior stairwells, windows, etc. Dependent on the building construction involved, breaching an exterior wall can also be considered if sufficient personnel and equipment are available.*

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Attic/Scuttle Ladder Method - Anytime a firefighter is trapped in a basement or sub floor, the easiest, most simplistic method of rescue should be initiated. The attic/scuttle ladder is by far the easiest means of gaining access to a firefighter(s) for sub floor rescue operations (not considering interior stairs). When deploying an attic/scuttle ladder for rescue consider the following:

Means of deploying the ladder – Consider the quickest method to gain access to the hole.

- Window
- Door way
- Wall breach

Ladder Placement and Stabilization – The ladder should be placed in a position that provides the greatest amount of space for entry and exit of the downed/trapped member and any potential rescuers. Corner placement (in square or rectangular openings) enables the firefighter the most working space when entering or exiting the hole. Corner placement allows the firefighter(s) to capitalize on the available space by forcing the SCBA cylinder into the opposing corner, which will allow more operating space for the rescuer(s) and downed/trapped member as he/she passes through the opening.

Surface rescuers should make every effort to stabilize the ladder in an upright position to allow for rapid access and egress. The ladder should be stabilized in a position close to 90 degrees; although this positioning is unusual to normal climbing angles seen on the fireground, the 90 degree angle will afford the rescuer(s)/downed/trapped members the greatest amount of space to pass through the established or existing opening.

SKILL SHEET 1: GAINING ACCESS: ATTIC/SCUTTLE LADDER

Introduction: *A Safety Engine/RIT crewmember locates a downed/trapped member who has fallen through a floor and is trapped in the sub floor below. These are the steps that need to be addressed to gain access to the victim(s) below using the attic/scuttle ladder method.*

ACTIVITY STEPS:

1. **Safety Engine/RIT Crewmember notifies Command and Safety Engine/RIT Crew Officer that he /she has located a downed/trapped member – provides specific location of victim (i.e. Victim is trapped in Subdivision 1, Sector A).**
2. **Request simultaneous exterior rescue operation to include: Search for secondary access points, exterior wall breach if applicable, etc.**
3. **Upon arrival of sufficient personnel and confirmation of a means of egress for the entering crewmember(s) – i.e. ladder, rope, etc., rescue personnel begin to prepare to gain access to the sub floor.**
4. **Rescuer lowers the attic or scuttle ladder into the hole; surface rescuers stabilize the ladder on the surface (Ladder should be positioned to provided the maximum clearance in and out of the existing opening.)**
5. **Rescuer descends the ladder to the sub floor.**

CAUTION: NO MEMBER SHOULD ENTER THE SUB FLOOR UNLESS A MEAN OF EGRESS HAS BEEN ESTABLISHED.

NEXT MONTH: In Part II of Sub Floor Rescue Techniques we will present two additional methods of gaining access to the sub floor while presenting several techniques used extract the downed/trapped member(s).

PROGRAM DEVELOPER:
Timothy E. Sendelbach is a 19 – year student and educator of the fire & emergency services currently working as the Chief of Fire Training for Savannah Fire & Emergency Services, Georgia. Tim formerly served as Assistant Fire Chief for Missouri City Fire & Rescue Services, Texas and as a Firefighter/Paramedic with the Kansas City, Kansas Fire Department. Tim has earned B.S. degrees in Fire Administration, Arson and an A.S. degree in Emergency Medical Care from Eastern Kentucky University.